



BEHAVIOR OF THE LABORATORY PROFESSIONAL AND BIOSAFETY

COMPORTAMENTO DO PROFISSIONAL DE LABORATÓRIO E BIOSSEGURANÇA

COMPORTAMIENTO DEL PROFESIONAL DE LABORATORIO Y BIOSEGURIDAD

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ABSTRACT

The fundamental concern of this research is to understand the biosafety/professional relationship in the work environment, report whether there is an incidence of accidents, proper functioning of establishments and safe behavior according to biosafety standards. There are convergences and divergences in the results, making them inconsistent. We conclude that there is a need to deepen the research, because there are gaps in the face of what has been observed from the literature analyzed, there are several points that need to be evaluated, because these make it impossible to exhaust the theme in a limited space.

KEYWORDS: Biosafety. Occupational Risk. Laboratory Biosafety. Health Personnel. Biological Risk

RESUMO

A inquietação fundamental desta pesquisa é compreender a relação biossegurança/profissional no ambiente laboral e relatar se há incidência de acidentes, funcionamento adequado dos estabelecimentos e comportamento seguro de acordo com as normas de biossegurança. Há convergências e divergências nos resultados, tornando-os inconsistentes. Concluiu-se que existe uma necessidade de aprofundar a pesquisa, pois há lacunas diante do que foi observado a partir da literatura analisada, há vários pontos que precisam ser avaliados, pois estes impossibilitam de se esgotar o tema em um espaço limitado.

PALAVRAS-CHAVE: Biossegurança. Risco Ocupacional. Biossegurança Laboratorial. Pessoal de saúde. Risco Biológico

RESUMEN

La preocupación fundamental de esta investigación es comprender la relación bioseguridad/profesional en el entorno laboral e informar si hay incidencia de accidentes, buen funcionamiento de los establecimientos y comportamiento seguro de acuerdo con los estándares de bioseguridad. Hay convergencias y divergencias en los resultados, lo que los hace inconsistentes. Se concluyó que existe la necesidad de profundizar en la investigación, debido a que existen lagunas en vista de lo observado a partir de la literatura analizada, hay varios puntos que necesitan ser evaluados, ya que estos hacen imposible agotar el tema en un espacio limitado.

PALABRAS CLAVE: Bioseguridad. Riesgo Laboral. Laboratorio de Bioseguridad. Personal sanitario. Riesgo biológico

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Introduction

Biosafety aims to prevent, minimize or eliminate the risk to health, both for the professional and for the environment. Laboratories and hospital environments must have a risk map, PPE and EPCs for all who have access to the restricted environment, applying the need for SOPs and Safety Manuals for laboratories, and regular inspections should be made by the competent body (ANVISA, 2005). Accidents that occur in the workplace are configured as occupational accidents, in whatever the area. In the health sector that is the object studied, the Notifiable Diseases Information System (Sinan) should be immediately communicated. System which aims to record and process these data in the national territory (including accidents with biological risk), so that it provides information for the analysis of the morbidity profile, thus contributing to decision-making at the municipal, state and federal levels through Ordinance No. 1,271, of June 6, 2014, of the Ministry of Health (FREITAS et al., 2017).

Some authors highlight information with high-index data on the growth of occupational accidents each year, demonstrating the lack of commitment on the part of the professional to biosafety.

According to Zochio (2009, p. 1-2)

In the opinion of experts who discuss biosafety, the big problem is not in the technologies available to eliminate and minimize risks, but in the behavior of professionals. Biosafety is not only related to modern air sterilization systems in a laboratory or safety clothing disinfection chambers. A health professional who does not wash his hands with the appropriate frequency or the hospital waste disposed of in the wrong way are day-to-day practices that also bring risks.

Considering what the literature presents, this research aims to propose an interest in attention to clinical analysis laboratories in the face of safety in the work environment (internal) and external environment, tracing the profile of laboratory biosafety. It is a subject little explored in Brazil, because in the Brazilian literature there are almost no studies on this content. In this scenario, questions were created that lead to this research:

- Is there an incidence of occupational accidents in clinical analysis laboratories?
- Do the laboratories work according to the standards established by Anvisa?
- Are safety protocols practiced by laboratory workers?

In this context, the primary objective of this study is to present biosafety in clinical laboratories, seeking to show the importance of the application in the daily practice of laboratory routine. To achieve the objectives (inquiries) presented, the methodology used in this study was a literature review, carried out from the analysis of the scientific literature as scientific articles made available electronically.

The theoretical foundation of the text was based on the following authors: (ARAÚJO FILHO et al., 2016; FARIA et al., 2011; FONSECA, 2012; FREITAS et al., 2017; LIMA; BARREIRA FILHO, 2016; LA ROTTA et al., 2018; MATELLO; VALENTE, 2012; NAVARRO; CARDOSO, 2009; OLIVEIRA



et al., 2015; PENNA et al., 2010; PEREIRA et al., 2010; ROCHA; BESSA; ALMEIDA, 2012; SILVA et al., 2009; SILVA; AUGUSTO; PEREZ, 2012; SIMONETTI, 2014; SOUSA SILVA et al., 2015; SILVA; RESENDE; CAMPOS, 2016; SANTOS et al., 2020; ZOCHIO, 2009).

Biosafety and laboratory behavior

This study was developed through a qualitative methodology, of a non-experimental nature through a literature review, analyzing articles, legislation and studies available in the electronic medium (internet).

The inclusion criteria were based on the association of descriptors: Biosafety, Occupational Risk, Laboratory Biosafety, Biological Risk. And, in addition to the descriptors, the research used national works based on biosafety with a publication date between 2009 and 2019. Initially, thirty-nine studies were selected, which included a monograph, CBT, doctoral thesis and an ANVISA Resolution.

In addition to articles, the material was obtained from the electronic media and from the SCIELO, LILACS, VHL and BIREME database. Nineteen references were excluded from the study, because they did not meet the objective proposed by the research. In the second moment, the registration of the material investigated was made, considering only research directly related to biosafety in laboratories, leaving only twenty bibliographies.

The results of the laboratory biosafety profile were drawn from proposed questions, where we investigated the occurrence of occupational accidents in clinical analysis laboratories, operation of the laboratory according to the standards established by Anvisa and behavior of the professional in the face of safety standards.

After analyzing the material, it was found that there is an incidence of accidents, but considered low when related to the amount in hospitals and medical clinics, where nursing staff professionals are the most affected, (nurses, assistants and technicians), because they deal directly with patients, and spend a lot of time in the workplace, being considered the recapping of needles as the main route (FREITAS et al., 2017; SILVA et al., 2009). In clinical laboratories, it is in the collection sector that the largest number of accidents occur, seconds before the end of collection, by means of sharps. The scenario in Brazil is worrying, because in the literature, the studies report an exacerbated amount of accidents, in which they have serious consequences, among them we can mention contamination by the HIV, Hepatitis B and C viruses (ZOCHIO, 2009).

In the study conducted by Silva et al., (2017), there are reports of accidents by more than half of the workers, and it is observed that the female sex was the most affected, however, this approach will not be addressed here, and may serve future research. However, the literature shows that the health area is more composed of this sex. According to the authors who research the topic worked on, the nursing class was once again highlighted. Biochemists, because they are often exposed to biological materials, also reported having an accident at some point, and although there are post-exposure instructions, some workers do not comply with them. Metello and Valente (2012), from their



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observations, cite the need for the staff composed of the nursing team to be more clarified in relation to how important the use of PPE is, they also talk about the importance of frequent hand washing, because this is a procedure incorporated into the routine of the nursing team. This procedure is considered one of the most important acts in the control of nosocomial infections.

Accident with biological agents only happen to those who are exposed to risk, taking into account the place, the position, the organization in which the professional is inserted (LA ROTTA, 2018). According to Andrade et al., (2015), the greatest risk observed in their study was biological, being classified as moderate or severe, justified by constant contact with biological materials. In the research by Fonseca (2012), the incidence of exposure to biological risks occurs during the procedure with the squirting or sneezing of biological material, in the handling of disposal boxes or even by the recapping of needles, considering that the resurfacing of needles is against biosafety standards (ANVISA, 2005).

In relation to operation, according to the literature there is a considerable amount of inadequacies, with a failure in inspections. The research carried out by Araújo Filho et al., (2016) and Simonetti (2014), report failures in the laboratory facilities in which participated in their studies, because these are related to inspection of health surveillance inspectors, with the Programs (PPRA), (PCMSO), (PGRSS), (POPs), with a lack and/or updating of specific SOP, employees who do not know these programs and procedures, who did not receive specific training before starting their activities, work alone in level 3 environments, which is prohibited by Anvisa, lack of accident notification documents, lack of monitoring of professionals intended for cleaning the laboratory, lack of clinical examinations, immunizations And storage of base serum as a control.

Lima et al., (2016), notes in his research laboratories with failures in the identification of the establishment, human resources, equipment, waste disposal, biosafety, operational processes, cleaning and quality control, work outside all the standards required by Anvisa, without a sanitary license, technical responsible, professional without proper registration with the equivalent council and there is no record of vaccine of employees, old equipment, The authors add that there was no Health Services Waste Management Plan, there are no biosafety manuals, but employees have access to personal protective equipment, but there is no collective protective equipment, failure in the pre-analytical, analytical and post-analytical phases, lack of SOPs, cleaning, disinfection and sterilization instructions, and there is no accreditation in any quality control program. The disposal of waste is also not carried out correctly, which will contribute negatively to the functioning of the laboratory, data that corroborate the findings of Araújo Filho et al., (2016) and Simonetti (2014).

In the study conducted by Fonseca (2012), there are reports of excessive noise in the work environment, these come from the equipment. Ergonomic risks related to the employee's poor posture were observed, most often due to lack of awareness, despite everything, it was reported that workers are in the same position for a long time, repeating the same movements and benches outside the appropriate size, and also cites the manipulation and inadequate storage of biological material, being carried out activities without the use of PPE, transportation without the appropriate box, that is, without



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obeying the proper biosafety standards. Observing both sides of the problem, where in addition to the findings of improper environments, there is the bad posture of the professional, a point that will be explored in the following paragraph.

Regarding the behavior of the health professional, the results are inconsistent, because there are convergences and divergences in the face of situations, there are reports in the literature that consider them as the main responsible for the occurrence of accidents, poor posture in the face of biosafety is the causative factor of these situations, because professionals who have already been involved in accidents are in situations that (SILVA; RESENDE; CAMPOS, 2016). In the study carried out by Pereira et al., (2010), and according to Simonetti (2014), in the answers presented, it was observed that not all individuals included in the study work correctly or follow a standardized work methodology, a deficiency reported even by most of the professionals themselves. According to Santos et al., (2020), the knowledge that is acquired in theory is not always practiced, and it is observed that health professionals included in their study do not adopt biosafety measures correctly, despite being a minority, there are professionals who do not know how to define what an PPE is, most do not update themselves in the field of biosafety, there are reports of Corroborate the findings of Silva, Resende and Campos (2016), Pereira et al., (2010) and Simonetti (2014).

For Zochio (2009), accidents go beyond the sectors of the health professional class, reaching cleaning professionals, due to misconduct of health personnel, because the improper disposal of infectious and sharp materials are the causes of these accidents. For Penna et al., (2010), and Silva et al., (2015), the biggest problem related to risks in the laboratory is not in the technologies available to eliminate or minimize such risks, but in the behavior of professionals. The relationship between accident risk versus everyday good practices within a laboratory is indispensable. It is not enough to have modern air sterilization systems or disinfection chambers for safety clothing, for example, if the professional does not wash his hands with the appropriate frequency or the garbage is disposed of in the wrong way (ANVISA, 2005).

According to Faria et al., (2011), risks can be reduced from the following hierarchy: elimination, replacement, engineering controls, risk signs and personal protective equipment. The changes impact various aspects in the laboratory, such as culture, working methods, technologies and ways in which individuals interact with each other, and the processes on which they will act.

The application and effectiveness of biosafety cannot be understood only as the performance of technical work and totally based on the objectivity of the procedures to be followed. There are numerous factors linked to the resistance of the correct execution of biosafety, situations such as lack of infrastructure, unmaintained equipment, laboratory areas in precarious conditions of use, lack of inputs, inadequate inputs.

The stagnation of minds related to risk exposure leads to underestimation and negligence. The success of research and science are above all values. This reality triggers processes of discouragement related to the implementation of risk containment initiatives, which can result in distraction actions, momentary or not, in the face of the feeling of failure. Infections acquired in



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hospital/laboratory environments have aspects that can be related, for example, to the obligation to wash hands, as well as to complex factors, mutation and resistance of biological agents. Despite the existence of specific biosafety procedures for this environment, there is a need for frequent requirements of the established, reassessing and advancing in terms of risk control (NAVARRO; CARDOSO, 2009)

According to Peres (2012), there is invisibility in risk situations, which are strongly associated with the domain of market interests, because to critically establish a field that integrates objects treated by various areas of knowledge and that enhances actions to protect human health and the environment, the normative use of risk analysis is not enough, thus deconstructing the image that the professional is entirely " Rocha et al., (2012), corroborates Peres (2012), in the situation in which, among the many invisible situations, he emphasizes those related to emerging and reemerging diseases, which health systems are not able to identify quickly and/or cannot establish adequate control and treatment measures, contribute to the increase in diseases. Without prior knowledge of these factors, it is unlikely that a message about a biotechnology or biosafety standard will be fully understood (meaning) and will lead to action by the audience, aimed at protecting them and ensuring their physical integrity and that of third parties (or the environment).

According to Augusto et al., (2012), there is a current reduction in biosecurity and biosecurity to compliance with a "risk assessment" prescription as a normative mechanism. It is a maneuver to control criticism and resistance to the dangers of certain technological inventions that is part of the perspective of meeting market interests, boosting the use of new technologies beyond what is reasonable for quality of life.

Risk analysis techniques undergo quantitative sophistication to produce scientificity and increase its veracity, but that in fact do not produce in practice the measures that guarantee the non-negative effect of these technologies on health and quality of life. Providing an environment with facilities within the regulations established by the managing body is of paramount importance for the operation to occur safely. Biosafety is a preponderant factor when it comes to the health/worker relationship, it is a widely discussed subject today, but without many advances in practice. In hospitals and medical clinics there are still many cases of occupational accidents. Making it necessary to understand such situations in the face of a context in which there is a preparation and availability of prevention measures. (AUGUSTO et al., 2012),

Final Considerations

The research presents convergences and divergences in the face of the issues addressed, there was a difficulty in finding publications of recent scientific productions on the proposed subject. In the problem developed to investigate biosafety applied to laboratory medicine in the face of this difficulty, the results become inconsistent. However, it was noted that, although the bibliographic materials do not have so many reports, even taking into account the number of publications on the subject, there are accident situations in the laboratory environment. Thus, we cannot rule out the



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importance of applying biosafety in the entire field of health. It is noted, therefore, the impossibility of exhausting the theme, because there is a need for a deeper and more critical search for the role of biotechnology and biosafety in the laboratory space.

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